June 22, 1965 M. KAISER 3,190,631

COIL SPRING LOCK

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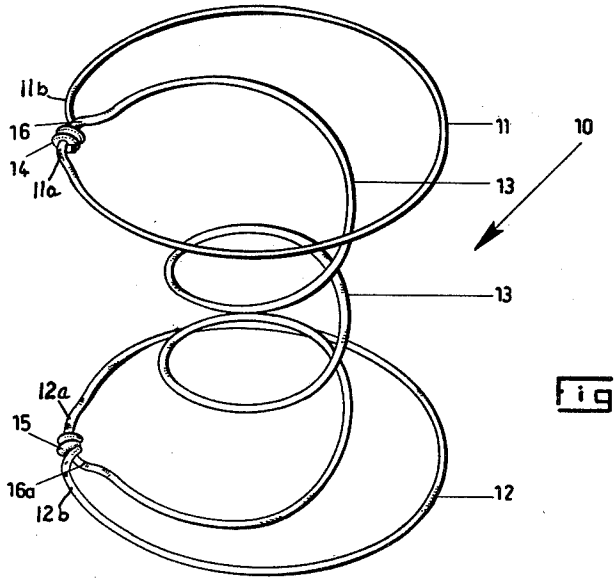


Fig. 1

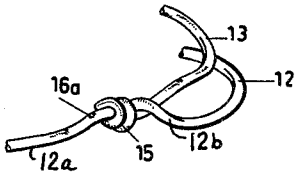


Fig. 4

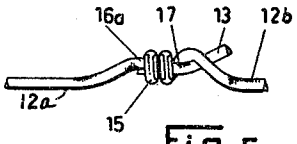


Fig. 5

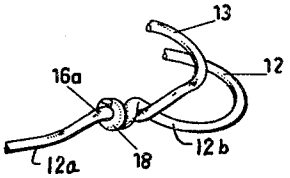


Fig. 6

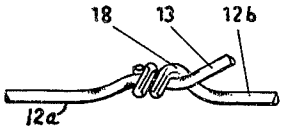


Fig. 7

INVENTOR.

Martin Kaiser

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COIL SPRING LOCK

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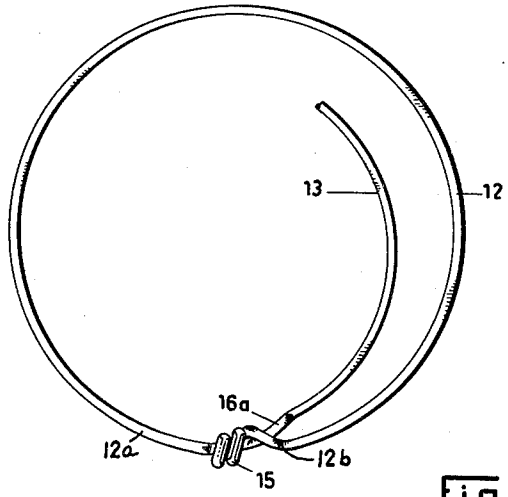


Fig. 2

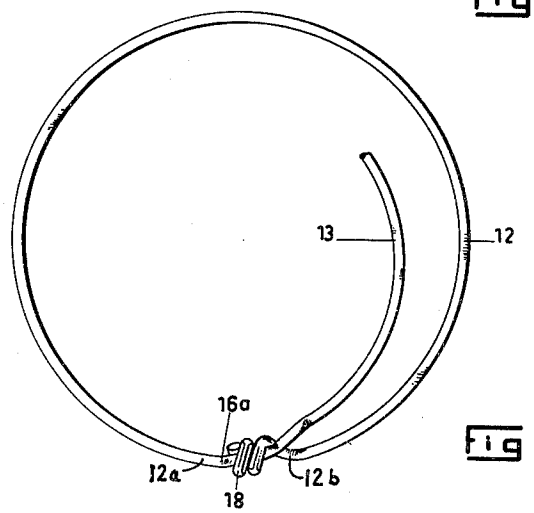


Fig. 3

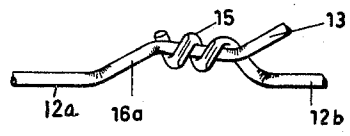


Fig. 8

INVENTOR.

Martin Kaiser

United States Patent Office

3,190,631

Patented June 22, 1965

3,190,631

COIL SPRING LOCK

Martin Kaiser, 66 Spencer Ave., Toronto, Ontario, Canada

Filed Dec. 24, 1962, Ser. No. 246,735
2 Claims. (Cl. 267—1)

This invention relates to improvements in spring filled furniture such as chesterfields, box springs, mattresses and the like, and, more particularly, to improvements in the upright helical springs utilized in the construction thereof.

It is conventional practice to utilize upright helical springs in the manufacture of box springs, mattresses and the like. These springs have their top and bottom coils larger than those in the center and their ends are secured by wrapping them several times around their adjacent convolutions. Thus the upper and lower ends of each spring are substantially but not perfectly circular and in parallel planes at right angles to the axis of the spring, having the disadvantage that the end circles tend to increase in diameter upon compression and to decrease in diameter upon subsequent expansion. This causes the wrapped ends to move axially upon their adjacent convolutions. This movement is further enhanced by the flattening of the convolutions of the spring upon compression, bringing them closer to becoming coplanar with the upper and lower circles and the wire of the adjacent convolutions thereby twisting within the wrapped ends.

A further disadvantage of conventional springs is that, upon two or more being placed end to end under compression, the end coils vary in the amount of flexure and this often results in one coil entering the next and becoming jammed, thereby lowering the total height of the springs and impeding the resilient action of the coils.

This expansion and contraction of the upper and lower circles of a spring applies a fluctuating pressure to fabric or the like to which the springs may be attached and, furthermore, being dry joints, the movement of the wrapped ends over their adjacent convolutions results in an annoying squeaking sound.

It is an object of this invention to provide a coil spring that will have end pieces which maintain a constant diameter under all normal conditions of wear.

It is another object of this invention to provide a coil spring that will have each end retained in fixed relationship with its adjacent convolution by incorporating a permanent, double bend in the convolution in which the end may be wrapped.

A further object of the invention is to provide a coil spring which, in a modified form of end attachment may have each end of the wire wrapped on either side of its particular joggle or crimp in order to locate them permanently in relation to their respective end convolutions, this also being easily embodied during manufacture.

It is still a further object of this invention to provide a coil spring that, as an aid to manufacturers, may have its ends passed over their adjacent convolutions or under same, either method being equally effective.

Yet another object of the instant invention is to provide a coil spring which will maintain the dimensions of its end convolutions under all circumstances and thereby prevent two or more of such coils becoming entangled when in axial alignment.

These and other objects and features of this invention will become apparent when taken in conjunction with the accompanying drawing in which:

FIG. 1 is a perspective view of a spring embodying the invention, showing the method of securing the ends.

FIG. 2 is a fractional plan view of the lower end of the spring as illustrated in FIG. 1 illustrating the method by which the free end is secured by first passing it over its adjacent convolution.

FIG. 3 is a fractional plan view of an alternative securing method in which the free end is secured by first passing it under its adjacent convolution.

FIG. 4 is a fractional perspective view of the knot portion of the spring illustrated in FIG. 2.

FIG. 5 is a side elevation of the knot illustrated in FIG. 4.

FIG. 6 is a fractional perspective view of the knot portion of the spring illustrated in FIG. 3.

FIG. 7 is a side elevation of the knot illustrated in FIG. 6.

FIG. 8 is a fractional side elevation of the invention as illustrated in FIG. 3, illustrating the means whereby the end remains in one permanent location on the convolution even when the knot becomes loose.

Referring to FIG. 1, an upholstery spring 10 is illustrated having an upper end coil 11, a lower end coil 12, and successive coils 13 tapering in size downwardly from upper coil 11 and upwardly from lower coil 12. Portions 11*a* and 12*a* of respective coils 11 and 12 is adjacent to and coextensive with coils 13, end portions 11*b* and 12*b* form helices 14 and 15 respectively.

Upper coil 11 and lower coil 12 are substantially circular, their planes being parallel and at right angles to the longitudinal axis of spring 10. End 11*b* of upper coil 11 is secured by being wrapped in a plurality of turns around its adjacent coil 13, forming a knot 14 adjacent portion 11*a*. End 12*b* of lower coil 12 is similarly secured, forming a knot 15 adjacent portion 12*a*.

The uppermost coil 13 incorporates a double joggled, abrupt bend 16 adjacent portion 11*a* of upper coil 11 adapted to receive knot 14, while the lowermost coil 13 embodies a similar abrupt double bend 16*a* adjacent portion 12*a* of coil 12 adapted to receive knot 15.

From FIGS. 2, 4 and 5 it will be seen that knot 15 is restrained from longitudinal movement upon coil 13 or along portion 12*a* of coil 12 by the sides of bend 16*a* and even in the case as shown by FIG. 8, where the convolutions of knot 15 have loosened, the knot 15 remains in its predetermined position on coil 13 and the dimensions of end coil 12 do not vary.

FIG. 5 in particular clearly illustrates the configuration in which portion 12*b* of coil 12 adjacent knot 15 is brought into close contact with coil 13 outside bend 16*a* at a point 17 prior to the wrap over process in which knot 15 is formed, so that knot 15 is additionally located on coil 13 between point 17 and the adjacent side of bend 16*a*, and portion 12*a* of coil 12 is illustrated as coplanar with portion 12*b* of coil 12, bend 16*a* being vertically disposed to coil 13. The lower surface of helix 15 is shown as adjacent to the plane coextensive with coil 12.

FIG. 4 illustrates bend 16*a* having a lateral curvature conforming to the lateral curvature of coil 13 and tangent to the circle defined by portions 12*a* and 12*b*, and the outer surface of helix 15 conforms to the circumference of the circle thus defined.

FIGS. 3, 6 and 7 illustrate an alternative method of knotting wherein end 12*b* of coil 12 is formed in a knot 18 by passing it under the relevant portion of coil 13 and subsequently wrapping it within bend 16*a*. It will be seen that knot 18 is also restrained by the sides of bend 16*a* and by the fact that the end 12*b* of coil 12 contacts coil 13 outside bend 16*a* before knot 18 is formed.

Condensing the general principles of my invention as above noted, this consists mainly of the method of knotting the free ends of a conventional helically coiled spring over the adjacent coils, the adjacent coil portion being vertically crimped at locations directly preceding the knot and directly after the knot, thereby preventing subsequent movement of the knot along the adjacent coil, the knot remaining securely fastened to the predetermined location

on the adjacent coil, thereby ensuring that the desired diameter of the end coils remain constant. Furthermore, the angle at which each end piece joins its adjacent coil is such that it first contacts the adjacent coil outside the crimped portion to further lock the knot into place. It should be noted that the vertical crimps in the adjacent coil does not substantially distort the circular configuration of the outside coils nor is the knot substantially displaced from a coplanar relationship to the outside coils.

It will be understood that the free ends may be knotted around the adjacent coil in either clock-wise or anti-clockwise direction as required. It is furthermore understood that my principle may be applied to coil springs of other than circular configuration, my principle not substantially distorting the desired form of the outside coils.

It will also be noted that crimping of the adjacent coil vertically away from the plane coextensive with the outside coil permits sufficient spaces therebetween to facilitate assembly of the coil on a mattress unit.

The embodiments of this invention in which an exclusive property or privilege is claimed are defined as follows:

1. An upholstery spring comprising: an upper end coil of substantially circular configuration; a lower end coil of substantially circular configuration, the planes of said end coils being substantially parallel and substantially at right angles to the longitudinal axis of said spring; successive coils between said end coils; a free end of each one of said end coils wound about the juncture of an adjacent one of said successive coils and said end coil to form a knot; a first bend in both said end coils adjacent said knots, said first bends being formed in a direction substantially in a plane parallel with said spring axis; and a second bend in both said end coils adjacent the opposite side of said knots, said second bends being formed in a direction substantially in a plane at right angles to said

spring axis, both said first and second bends co-operating in securing said knots against movement on said coils thereby to maintain the dimensions of said spring.

2. An upholstery spring comprising: an upper end coil of substantially circular configuration; a lower end coil of substantially circular configuration, the planes of said end coils being substantially parallel and substantially at right angles to the longitudinal axis of said spring; successive coils between said end coils; a free end of each one of said end coils wound about the juncture of an adjacent one of said successive coils and said end coil to form a knot, said knot being wound in a clockwise fashion, thereby to maintain spacing between said end coils and said adjacent successive coils in the vicinity of said knots; a first bend in both said end coils adjacent said knots, said first bends being formed in a direction substantially in a plane parallel with said spring axis; and a second bend in both said end coils adjacent the opposite side of said knots, said second bends being formed in a direction substantially in a plane at right angles to said spring axis, both said first and second bends co-operating in securing said knots against movement on said coils thereby to maintain the dimensions of said spring.

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ARTHUR L. LA POINT, *Primary Examiner.*